

change of direction. At Rowmari, for instance, besides the fissures parallel to the bank of the Brahmaputra, which here runs nearly north-east and south-west, a large fissure runs to the south-east at right angles to the river bank for a distance of at least 500 yards, where it becomes lost in a jheel, and is said to be traceable for a distance of nine miles. Sand and mud were ejected from the fissure to a depth of at least four feet. Other fissures

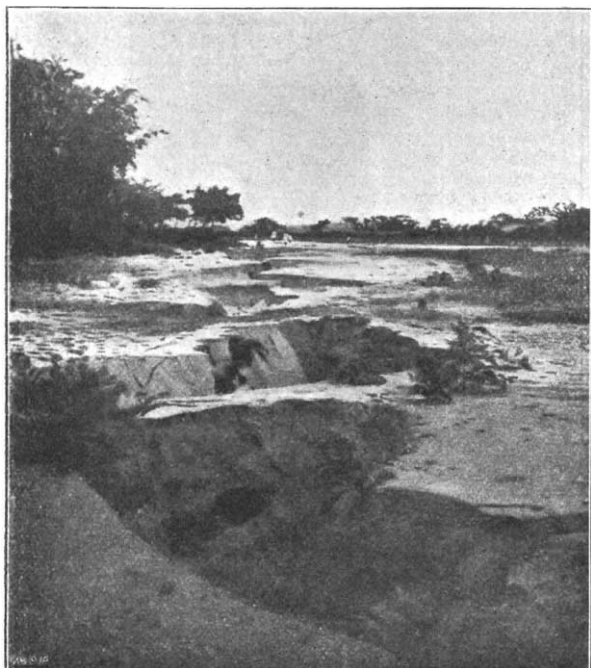


FIG. 3. — Fissure at Rowmari.

branch off from this. Subsequent to the ejection of the sand, the surface sank down to a depth proportional to the amount of material ejected, and several crater-like hollows were formed as the water drained back into the fissure. Illustrations of this and many other effects are given by Mr. Oldham, and his complete report upon the Indian earthquake, in all its scientific aspects, is a memoir which will take its place among classical papers on seismology.

INVESTIGATIONS OF THE HABITS AND FOLK LORE OF AUSTRALIAN ABORIGINES.

EARLY in the summer a memorial was submitted to the Governments of South Australia and Victoria praying that facilities might be granted to Mr. Gillen, one of the inspectors of aborigines, and Prof. Baldwin Spencer for the continuance of their investigations into the habits and folk-lore of the natives of Central Australia and the Northern Territory. The memorial, which was signed by all British anthropologists and many prominent representatives of other sciences, has met with a prompt and generous response. The Government of South Australia has granted a year's leave of absence to Mr. Gillen, and the Government of Victoria has provided a substitute for Prof. Spencer during his absence from Melbourne. Mr. Syme, the proprietor of the *Melbourne Age*, has contributed 1000*l.* towards the ordinary expenses of the expedition. The Government of South Australia has also allowed the expedition to make use of the depôts and staff of the Transaustralian telegraph for the forward-

ing and storage of supplies. The explorers start in February, and it may be confidently anticipated that, if the winter rains make conditions favourable for travelling, they will be rewarded with the same conspicuous success which attended their expedition of three years ago; although the task before them requires even greater tact, since the natives of the Northern Territory are more difficult to deal with than the aborigines of the centre, who know Mr. Gillen and regard him with the utmost confidence. The tribes of the MacDonnell Ranges will be studied even more minutely than before, and afterwards the explorers will go towards the Gulf of Carpentaria, along the Roper River, and, time permitting, proceed down the Daly and Victoria Rivers.

To quote from the *Adelaide Advertiser* of October 4, "It scarcely needs a scientific mind to appreciate the value of the task which Messrs. Gillen and Spencer are about to renew, and possibly complete. The mystery their labours will contribute to unveil may well captivate the fancy of the most unlearned 'man in the street.' . . . The breath of the white man has scorched out of existence so many aboriginal races and tribes that civilisation may be thankful that there are still untutored savages left to throw light on its own beginnings."

NOTES.

SIR JOSEPH HOOKER has been elected a Foreign Associate of the Paris Academy of Sciences.

THE death is announced of Prof. G. F. Armstrong, Regius professor of engineering at Edinburgh University since 1885.

THE death is announced of the Rev. Father Armand David, Correspondant of the Paris Academy of Sciences, in the Section of Geography and Navigation.

WE learn from the *Athenaeum* that the Amsterdam Society for the Advancement of Medical and Natural Science has conferred its Swammerdam Medal upon Prof. Carl Gegenbauer, of Heidelberg.

DR. HERMAN S. DAVIS, recently expert computer of the U. S. Coast Survey, has been appointed observer at the International Latitude Observatory at Gaithersburg, Maryland, one of the six stations established by the Centralbureau der Internationalen Erdmessung for an investigation of variations of latitude.

WE are asked to announce that the Thomson Foundation Medal of the Royal Geographical Society of Australasia will be awarded to the author of the best original paper on each of the following subjects:—(1) The commercial development, expansion and potentialities of Australia—or, briefly put, the commerce of Australia. To be sent in not later than October 15, 1901. (2) The pastoral industry of Australia, past, present and probable future. To be sent in not later than June 15, 1902.

THE College of Physicians of Philadelphia announces that the next award of the Alvarenga Prize, being the income for one year of the bequest of the late Señor Alvarenga, amounting to about 180 dollars (36*l.*), will be made on July 14, 1901, provided that an essay deemed by the Committee to be worthy of the prize shall have been offered. Essays intended for competition may be upon any subject in medicine, but must be unpublished. They must be received by the secretary of the college on or before May 1, 1901. The Alvarenga Prize for 1900 has been awarded to Dr. David de Beck, of Cincinnati, Ohio, for his essay entitled "Malarial Diseases of the Eye."

We learn from *Science* that the New York Board of Health is building, at a cost of 4000*l.*, a laboratory to be wholly devoted to the study of the bubonic plague. Special care will be taken in its construction. The ground floor will be occupied chiefly with eight stalls for horses that will supply the anti-plague serum. A staircase from the outside will lead to the upper floor, where experiments will be carried on. The walls and floor are to be of steel and cement, so as to be rat proof, and the windows are to be especially screened to keep out flies and mosquitoes.

It will be remembered that shortly after the death of the late Mr. G. J. Symons, F.R.S., the founder of the British Rainfall organisation, a movement was started for the foundation of a memorial to him. It was resolved that the memorial should take the form of a gold medal, to be awarded from time to time by the Council of the Royal Meteorological Society for distinguished work in connection with meteorological science. The committee appointed to take the necessary steps to raise a fund for that purpose announce that the appeal has met with a hearty response from meteorologists, water engineers and other admirers of Mr. Symons's work. The fund will be open until the end of January next, and subscriptions should be sent to the treasurer, Dr. C. Theodore Williams, 70, Victoria Street, Westminster.

THE Vienna correspondent of the *Times* states that two facts of considerable importance, both to sanitary authorities and the general public, are set forth in the definitive report of the Austrian Medical Commission of the Vienna Imperial Academy of Science, sent to Bombay in 1897 to study the issue of a work on the morphology and biology of the bacillus and on artificial infection, &c. It has been prepared by Drs. Albrecht and Ghon, both surviving colleagues of Dr. Müller, who died of the plague in Vienna two years ago under melancholy circumstances reported at the time. The experiments recorded in the work now published show that certain species of animals are easily infected by rubbing the virulent matter lightly on the skin even when it is perfectly intact and free from injury. This is said to be the most frequent and important form of infection in the case of human beings. The second result of the experiments conducted in Vienna, which were forbidden after the unfortunate accident that cost the life of Dr. Müller and two other victims in 1893, has been to prove that perfect immunity can be given to the most susceptible animals against injections which would otherwise be absolutely fatal.

THE mode of infection with plague was referred to by Prof. A. Calmette in the second Harben lecture, delivered at the Examination Hall of the Royal College of Physicians and Surgeons on November 14. In the course of his lecture, Prof. Calmette said (reports the *Lancet*) that certain epidemics of plague had been remarkable for the fact that all the cases presented a primitive pneumonic form, the mode of entry having been, therefore, exclusively through the nose or mouth, while in others the infection had been produced by the skin, either following slight excoriations or bites of fleas, bugs, and other parasitical insects. During the epidemic in Portugal last year, he observed with Salimbeni a case in which the infection was through a bug-bite. Hankin and Simond, in India, had cited several examples of individuals who had contracted plague from touching diseased or dead rats. It was probable that the transmission of the plague to the man was by fleas living on the rats. Experiment in the laboratory had shown how quickly a healthy rat would contract the plague if caged with a diseased rat which was infested with fleas, while a healthy rat remained healthy when shut up with one which was diseased but was free from fleas. Whatever the mode of entry of the virus, multiplication of the plague bacillus resulted first in the lymphatic channels and then in the blood.

THERE ought to be a ready and liberal response to the appeal for contributions to establish a permanent memorial to the late Miss Mary Kingsley; for her works on the customs and institutions of the native races of West Africa are admired by a large public. A strong and representative committee has been formed, and it has been decided that, if sufficient funds are obtained, the memorial shall take the form of a small hospital, to be established in connection with the Liverpool School of Tropical Medicine, and shall also be used to institute "The Mary Kingsley Society of West Africa," to stimulate research and collect information concerning West Africa. Much information of the required kind as to West African sociology is already on record, scattered through the works of the older writers on those parts, as well as in more recent books of travel, in papers published in periodicals, in Blue-books and in official reports; and a very great deal more may still be gathered by Government officials, traders, missionaries, travellers and by the small but remarkable band of natives who are already educated. It is proposed that the "Mary Kingsley Society" should employ a trained ethnologist, both to collect and arrange in scientific form the material which is thus already on record, and to institute and direct research for further material of the same sort. Subscriptions may be assigned by the donors to either the hospital or the society, and the two funds will be kept separate. Contributions for the "Mary Kingsley Memorial Hospital" should be sent to Mr. A. H. Milne, B. 10, Exchange Buildings, Liverpool, and for the "Mary Kingsley Society of West Africa" to Mr. George Macmillan, St. Martin's Street, London, W.C.

THE U.S. Pilot Chart of the North Atlantic Ocean for November gives the longitude at which a number of vessels bound round Cape Horn crossed the latitude of 50° S. in the Atlantic and the Pacific respectively, and shows the courses followed by ships making the best and worst passages. The time occupied varied from eight to thirty days. Some of the captains kept as closely as possible to Cape Horn, while others reached the parallel of 60° S. In no other part of the world are the meteorological conditions more trying, owing to the persistency and violence of the westerly winds, the turbulence of the sea and frequent blinding squalls of hail and sleet. The Hydrographic Office has, therefore, rendered good service in pointing out the route to be followed, and the necessity of adapting it to the prevailing meteorological conditions, especially with regard to barometric pressure. A vessel fortunate enough to encounter easterly winds in rounding the Horn can only retain them as long as possible by remaining on the southern side of the low barometric pressure which they surround, instead of standing at once to the N.W., regardless of the indications of the barometer.

THE report of the Prussian Meteorological Office for the year 1899 points with satisfaction to the increased uniformity of action between all the German States as regards the methods of discussion and publication of observations, and to the tendency towards augmenting the number of observing stations where necessary. An important investigation has been carried out by Dr. Edler, at the suggestion of Dr. v. Bezold, on the influence of stray currents from electric tramways on the instruments for measuring terrestrial magnetism, with a view to determining the minimum distance to which magnetic observatories should be removed. The result shows that the observatory must be at least five miles from the line, and, for researches of a delicate nature, at least twice that distance is required. Special attention is paid to the investigation of the upper air by means of kites and balloons. Two of the unmanned balloons reached, during the year in question, about 22,000 and 26,000 feet respectively, and we learn from other sources that these important investigations are being actively carried on during the current year.

IN the *Journal* of the College of Science, Imperial University of Tokio, Prof. H. Nagaoka and Mr. K. Honda discuss the changes of volume and of length in iron, steel and nickel ovoids by magnetisation, and a separate paper by Mr. K. Honda deals with the combined effect of longitudinal and circular magnetisation on the dimensions of tubes of these metals. Among various results of the combined investigation we notice that:—(1) the transient current, as well as the longitudinal magnetisation produced, by twisting an iron or steel wire is opposite to that produced by twisting one of nickel up to moderate fields; (2) the transient current, as well as the longitudinal magnetisation produced, by twisting an iron, steel or nickel wire reaches a maximum in low fields; (3) in strong fields the direction of the current, as well as the longitudinal magnetisation, is the same in iron, steel and nickel. In alluding to this work we cannot but draw attention to the evidence of Japanese enterprise that is afforded by the publication of a journal containing scientific papers in English and German by Japanese professors and university graduates.

IN the *Philosophical Magazine* for September Dr. Sydney Young discusses the Law of Cailletet and Mathias, according to which the mean of the densities of a liquid and its saturated vapour for any stable substance is a rectilinear function of the temperature. It appears, among other results of this investigation, that the law, though approximately satisfied, is not absolutely true unless the ratio of the actual to the theoretical density at the critical point has the normal value 3.77. In most cases if the mean density be expanded in powers of the temperature, the sign of the coefficient of the second power depends on whether the ratio in question is greater or less than the normal. The coefficient of the second power is so small that the linear formula may be used to calculate the critical density from observations at temperatures above the boiling point, but the error thus introduced becomes considerable if it be required to calculate the critical density from observations of mean densities at lower temperatures; moreover, as pointed out by Guye, the law fails when the molecules differ in complexity in the liquid and gaseous states.

IN the *Journal de Physique* for September, M. E. Mathias discusses two interesting groups of loci relating to the thermodynamic properties of a liquid in presence with its saturated vapour. The first is the locus in the (p, v) plane of points, such that the volume of the liquid is equal to that of the vapour (the total mass being unity). This locus, the author finds, is a curve constantly convex towards the axis of abscissæ, and is the only one of the curves defined by the constancy of the ratio of the volumes of the liquid and vapour, which cuts the curve of saturation at a finite angle at the critical point. M. Mathias proves that the locus has no point of inflexion, but that the angular coefficient increases with the temperature. The second group discussed consists of the curves for which the masses of the liquid and vapour are constant. In accordance with Raveau's investigation, the only one of these curves which cuts the curve of saturation at a finite angle is that corresponding to equal masses of liquid and vapour.

MR. S. H. BURBURY communicates to Wiedemann's *Annalen* a reply to certain objections raised by Herr Zemplén Győző against his modifications of the Kinetic Theory of Gases. In it he gives certain amplifications of his proof of the property that the mean values of the products of velocities of neighbouring molecules of a gas are positive, and discusses the point at which his method diverges from those leading to the ordinary Boltzmann-Maxwell distribution.

THE U.S. Department of Agriculture has issued a bulletin containing records of investigations made by Mr. M. E. Jaffa, NO. 1621, VOL. 63]

at the Agricultural Experiment Station of the University of California. A number of analyses of food materials were made, and dietary studies were conducted with a football team and with a chemist's family, as well as with a number of infants. In one instance the metabolism of nitrogen of an infant was also studied. Such investigations cannot fail to furnish aid in fixing upon dietary standards, and the proper factors to be used in computing the amounts eaten by persons of different ages as compared with an adult man.

FROM Messrs. B. O. Peirce and R. W. Wilson we have received a paper on the thermal diffusivities of different kinds of marble, published in the *Proceedings* of the American Academy of Arts and Sciences, xxxvi. 2. The tables which the authors give of the specific heats of various marbles are useful for several purposes, and the law of variation of the specific heat of dry Carrara marble with the temperature appears to be well represented by the formula $S = 0.1844 + 0.000379 t^2$.

AT the last meeting of the Liverpool Geological Society, a paper was read on the carboniferous limestone of Anglesey, by the late Mr. G. H. Morton. The paper was left by the author in a finished state, and was intended by him to be the concluding portion of the series of papers on the carboniferous limestone of North Wales, on which he had been engaged for a period of nearly forty years. We are informed that, in addition to the paper itself, Mr. Morton left revised lists of fossils brought up to date with their comparative rarity or otherwise, for the districts previously described, but unfortunately the list for Anglesey was not completed, as he intended to visit one or two localities this summer to check his lists. It is intended to print the completed lists, but not the Anglesey list. Lists for certain localities in Anglesey were incorporated by Mr. Morton with his paper, which will be printed in full in the Society's *Proceedings*.

A LECTURE on the coal resources of Victoria, Australia, was delivered at the Imperial Institute, on Monday evening, by Mr. James Stirling, mining representative of the Colony. The attention of most nations is now turned to their coals. The demand to-day, owing to the rapid development of industries and extension of commerce, is greater than it has ever been before. The Australian Colonies have large areas of coal-bearing territory, and up to the present have produced a million tons of coal, the largest output having been from New South Wales. After giving a short account of the first discovery of coal in Victoria, Mr. Stirling said that about ten years ago he had been deputed to investigate the Gippsland coalfields, and he had been able to prove that within an area of 3,000 square miles of Jurassic rocks there were a number of seams of good black coal from 2 to 5 feet in thickness. But it is in brown coal that Victoria is specially rich. From borings carried on over a distance of 50 miles in the Latrobe Valley, Mr. Stirling has estimated that there cannot be less than 31,144,400,000 tons of brown coal. In several places shafts had been sunk through beds of from 20 to 200 feet thick, and at one place a coal bed, 70 feet thick, is being worked as a quarry by open face. Various analyses of these coals have shown them to be superior to the average German brown coal, and to have a much smaller percentage of ash. Austria, Germany and Italy have put their smaller deposits of this coal to commercial uses by compressing it into briquettes, distilling oils, etc., and the same could be done in Victoria, besides converting the fuel directly into electrical energy.

THE Geological Survey has published the second part of "The Geology of the South Wales Coal-field," in which the country around Abergavenny, included in the new series map, No. 232, is described by Messrs. A. Strahan and W. Gibson. A study of

the northern part of the Usk inlier of Silurian rocks confirms the opinion that a well-defined plane of division separates these strata from the Old Red Sandstone. A small portion of the Black Mountains, with the Old Red Sandstone Sugar Loaf, and the fine escarpment of the Bloreng, formed of Old Red Sandstone and Lower Carboniferous rocks, come in for description, to which Mr. J. R. Dakyns contributes. The Carboniferous Limestone displays the phenomenon of dolomitisation with unusual clearness, and notes on microscopic sections of the rock are contributed by Prof. W. W. Watts. Special attention is naturally given to the Coal-measures, and it is pointed out that while the coals are more extensively worked than formerly, the iron-ores are now hardly worked at all. The Glacial Drifts present many features of interest, notably in the case of a transported mass of Carboniferous grit, which forms a small hill upwards of 200 yards in length, and rests on Boulder Clay.

IN the October issue of the *American Naturalist*, Prof. H. F. Osborn reconsiders the evidence in favour of the existence in the Permian of a common ancestral stem from which have diverged dinosaurs and birds. It is argued that many of the resemblances between these groups are adaptive rather than genetic, while the apparent close correspondence in the structure of the pelvis between adult birds and the herbivorous dinosaurs (which are specialised types) is due in a considerable degree to a misinterpretation of the homology of some of their elements. Nevertheless, the resemblances between the two groups are so numerous as to justify the belief of kinship. And special importance attaches to the opinion that some sort of bipedalism was a common character of all dinosaurs, the suggestion being countenanced that certain forms, like *Stegosaurus*, have reverted from a bipedal to a quadrupedal mode of progression. Our present knowledge, therefore, justifies us in saying that "in this bipedal transition, with its tendency to form the tibiotarsus, the avian phylum may have been given off from the dinosaurian. This form of the Huxleyan hypothesis seems more probable than that the avian phylum should have originated quite independently from a quadrupedal proganosaurian reptile, because the numerous parallelisms and resemblances in dinosaur and bird structure, while quite independently evolved, could thus be traced back to a potentially similar inheritance."

VOLUME II., part 3, of the *Annals* of the South African Museum is occupied by the continuation of Sir George Hampson's synopsis of the moths of South Africa.

THE interest attaching to the great skua gull, on account of its narrow escape from extermination in the Shetlands, will cause many ornithologists to hail with satisfaction the account of its habits in the southern hemisphere, published by Mr. R. Hall in the October number of the *Victorian Naturalist*. The extent of the geographical range of this bird—from the Shetland Islands past Kerguelen's Land to New Zealand, and sparingly between the Cape of Good Hope, Ceylon and Southern Australia—is very remarkable.

THE latest issue of the *Morphologisches Jahrbuch* (vol. xxix. part 1) contains the results of an elaborate investigation by Dr. O. Grosser into the anatomical structure of the nasal cavity and throat of the species of bats indigenous to Germany. In the same number Prof. L. Balk describes and figures a human vertebral column presenting the rare abnormality of only six (instead of seven) cervical vertebræ. The comparative anatomy of the eye-muscles forms the subject of a communication by Herr H. K. Corning; while the nature of the partition between the pericardiac and peritoneal cavities engages the attention of Herr F. Hochstetter.

THE first three parts of a lavishly illustrated work on the "Living Races of Mankind" have been published by Messrs. Hutchinson and Co. The work is by the Rev. H. N. Hutchinson, the author of "Extinct Monsters" and other works of popular natural science, assisted by Prof. J. W. Gregory and Mr. R. Lydekker, F.R.S. There will be eighteen parts, published at fortnightly intervals, and when complete the work will be an attractive, as well as instructive, account of the customs, habits, pursuits, feasts, and ceremonies of the peoples of the world. Much care and trouble have been expended in collecting the photographs to illustrate the text, and it is to be hoped that the enterprise will meet with success. It is highly important that the British public should be interested in the study of ethnology, and the work now in course of publication will assist in attaining this end.

A FEW weeks ago Sir William White, the president of the Institution of Mechanical Engineers, brought before the Institution a letter from the Association of German Engineers suggesting that scientific and technical societies in the United States, France, Germany and England should unite in the preparation of an English, French and German technical dictionary. It was decided not to officially take part in the scheme, but the members of the Institution were invited to assist in the work. We are reminded of this by the appearance of the second volume of a "Practical Dictionary of Electrical Engineering and Chemistry, in German, English and Spanish," by Mr. Paul Heyne, which has just been received from Messrs. H. Grevel and Co. The dictionary is published in three volumes, one with German words alphabetically arranged, and their English and Spanish equivalents in parallel columns, and the two other volumes with English and Spanish words alphabetically arranged. The dictionary should be of value in manufactories and business houses concerned with engineering work.

THE second volume of "A Hand-List of the Genera and Species of Birds," by Mr. R. Bowdler Sharpe, has been issued by the Trustees of the British Museum. This volume contains the parrots and those birds commonly known as "Picarians," thus leaving the Passerines for the third volume. We propose to postpone a detailed notice of this useful work till the issue of the last volume.

THE additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus sinicus*) from India, presented by Mr. D. Nagle; a Barbary Ape (*Macacus maurus*) from North Africa, presented by Mr. Thomas Pink; a Common Squirrel (*Sciurus vulgaris*), British, presented by Mr. C. W. Labarte; two Black Kites (*Milvus migrans*) from East Africa, presented by Mr. Campbell Hansburg; two Auriculated Doves (*Zenaida auriculata*) from South America, presented by Mrs. Aston; a Redbreast (*Erithacus rubecula*), British, presented by Canon Wilberforce; a Common Fox (*Canis vulpes*), British, presented by Mr. W. B. Spiers; a Horned Lizard (*Phrynosoma cornutum*) from California, presented by Mr. H. L. Brackenbury; a Common Chameleon (*Chamaeleon vulgaris*) from North Africa, presented by Mr. Small; two Brown Hyænas (*Hyaena brunneus*, ♂ ♀) from South Africa, a Common Wolf (*Canis lupus*, white var.), European, a Crab-eating Raccoon (*Procyon cancrivorus*) from South America, two Rosy Parrakeets (*Palaeornis rosa*, ♂ ♀) from Burmah, two Vernal Hanging Parrakeets (*Loriculus vernalis*) from the East Indies, a Malabar Mynah (*Poliopsis malabaricus*) from Hindostan, a Grey Monitor (*Varanus griseus*) from North Africa, three Giant Toads (*Bufo marinus*) from South America, deposited; an Indian Cobra (*Naia tripudians*) from the East Indies, purchased.